

### Abstract

An arrangement for saving energy in a radio device transmitter and a radio device. The steady currents of the transmitter amplifiers are made dependent on the transmitting power for reducing the losses of the amplifiers. The VGA (400) comprises at least one main differential pair (Q41-Q42; Q43-Q44) for controlling the gain and a bias differential pair (Q47-Q48) for controlling said steady currents. These pairs are steered by the one and the same voltage ( $\Delta V$ ), in which case the output current ( $I_{b1}$ ;  $I_{b2}$ ) of the bias differential pair changes in the same way as the output current ( $I_{o1}$ ;  $I_{o2}$ ) of the main differential pair when the gain is readjusted. The output current of the bias differential pair is used as a bias current of the transmitter amplifiers, i.e. as a current that determines the steady currents of the amplifiers. Because the values of the steady currents of the amplifiers track accurately the value of the gain, when this is changed, the steady currents are always so low as the transmitting power necessarily requires, at a given time, wherein the amount of needless losses, from the transmitting operation's point of view, is small. Said differential pairs are placed on one and the same substrate, in order to the control to function accurately in a wide dynamic range.

Fig. 2